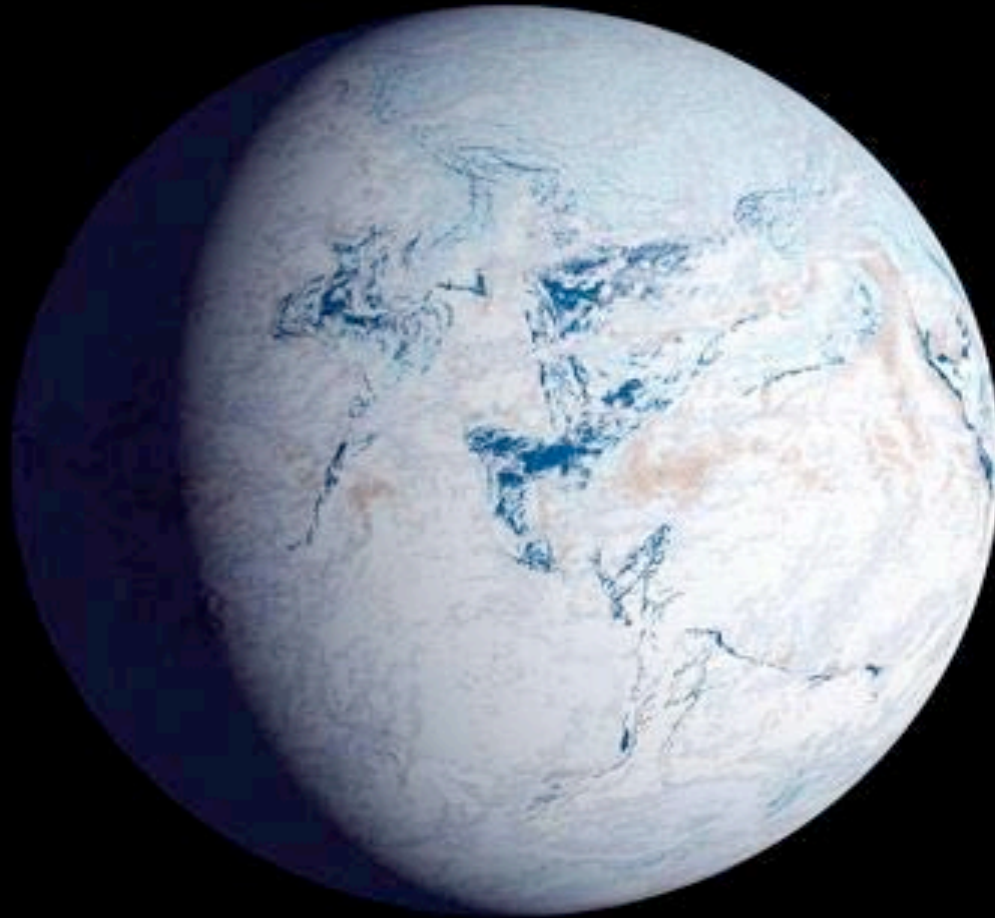


Habitat Space on a Snowball Earth: Understanding Life On the Outer Edge of the Habitable Zone

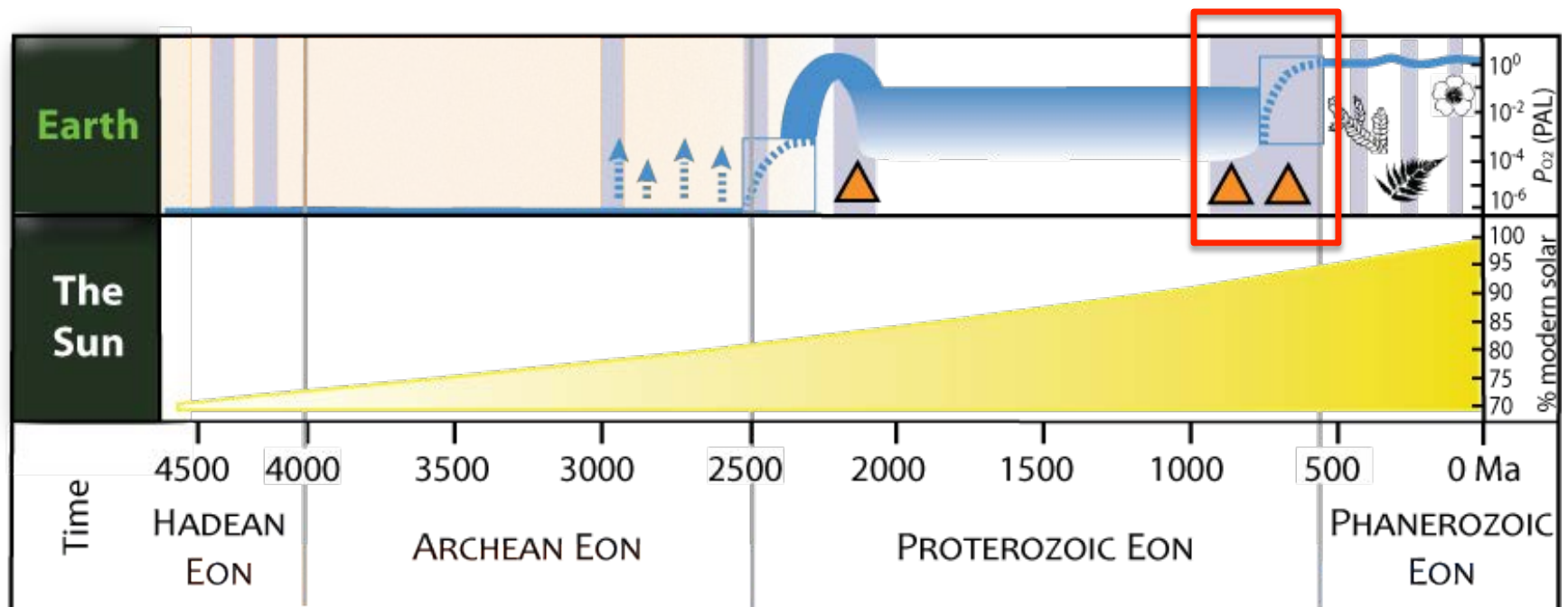


Jonathan Chin¹, Francesca Lingo², Mary Anne Woody³, Linda Sohl⁴

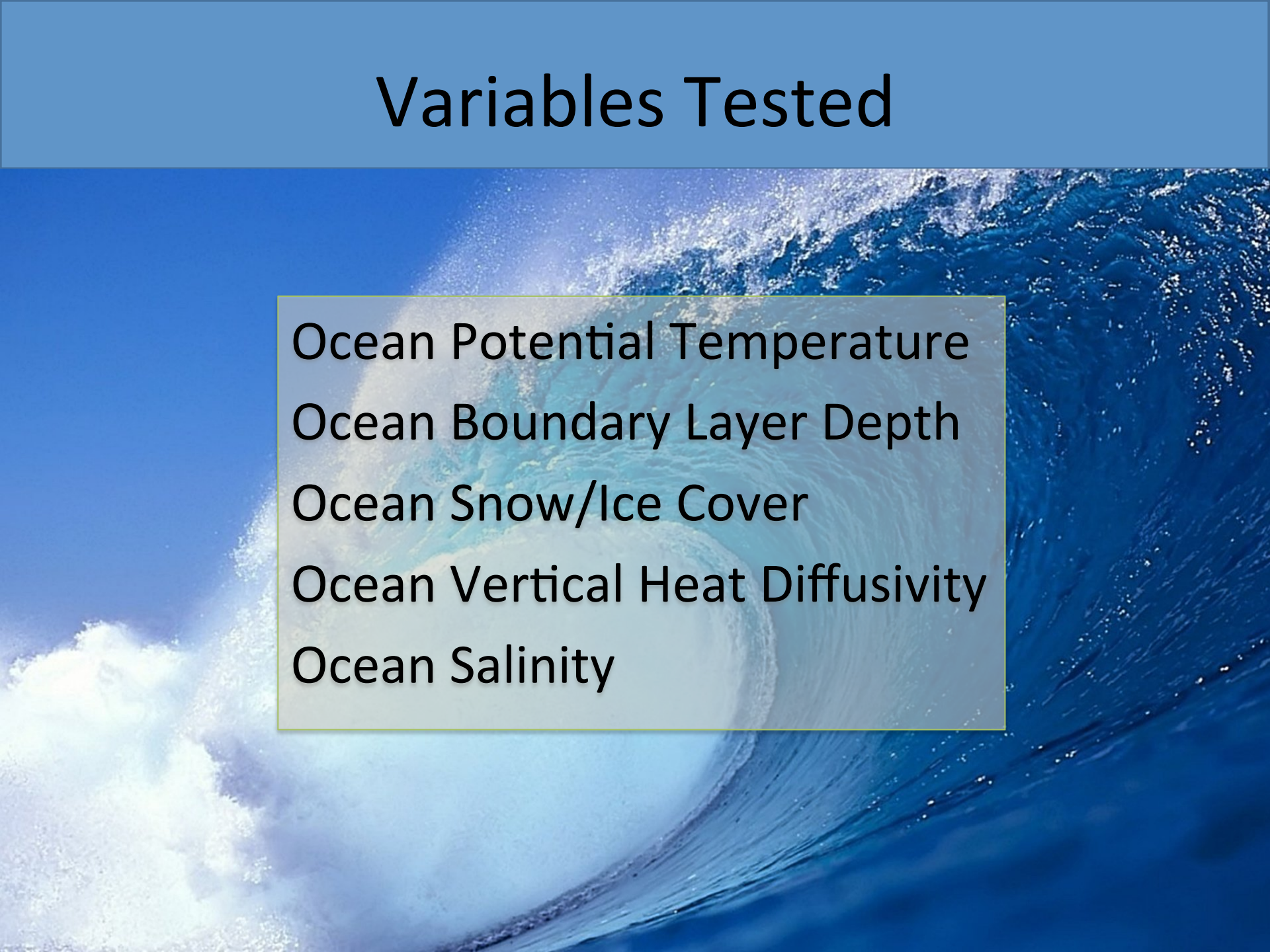
¹Brooklyn Technical HS, ²City College-CUNY, ³Xavier HS, ⁴NASA/GISS at Columbia University

NYCRI – August 6, 2015

What is Snowball Earth?



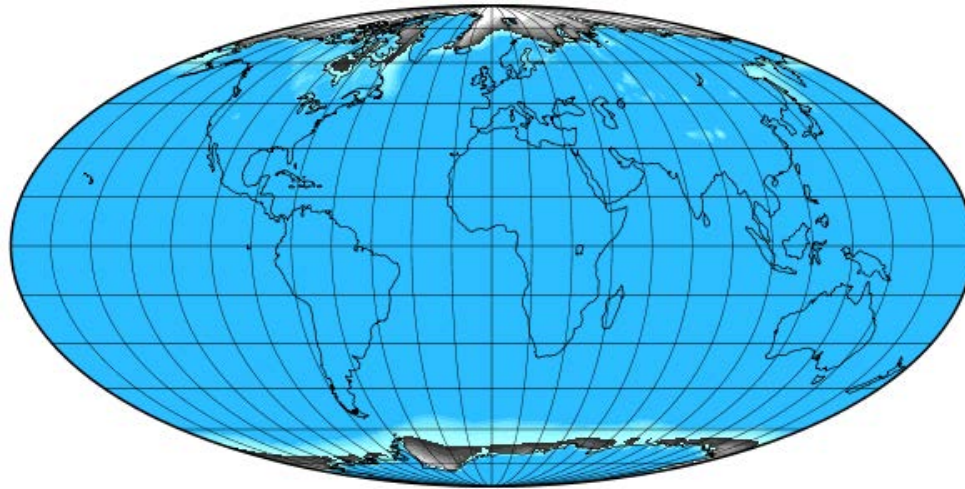
Variables Tested



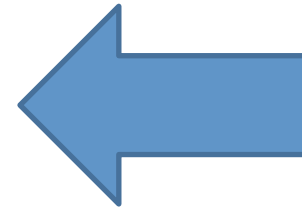
Ocean Potential Temperature
Ocean Boundary Layer Depth
Ocean Snow/Ice Cover
Ocean Vertical Heat Diffusivity
Ocean Salinity

Ocean/Lake Ice Coverage

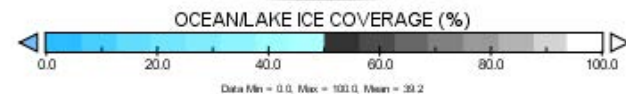
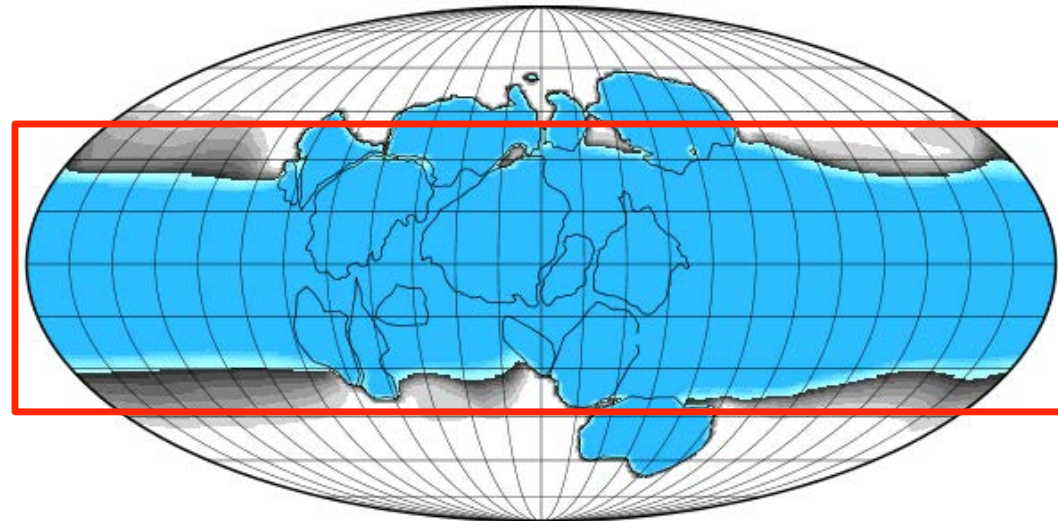
OCEAN/LAKE ICE COVERAGE



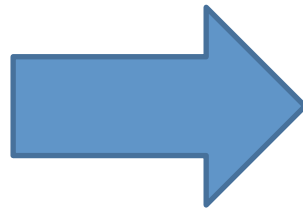
MODERN
CONTROL
RUN



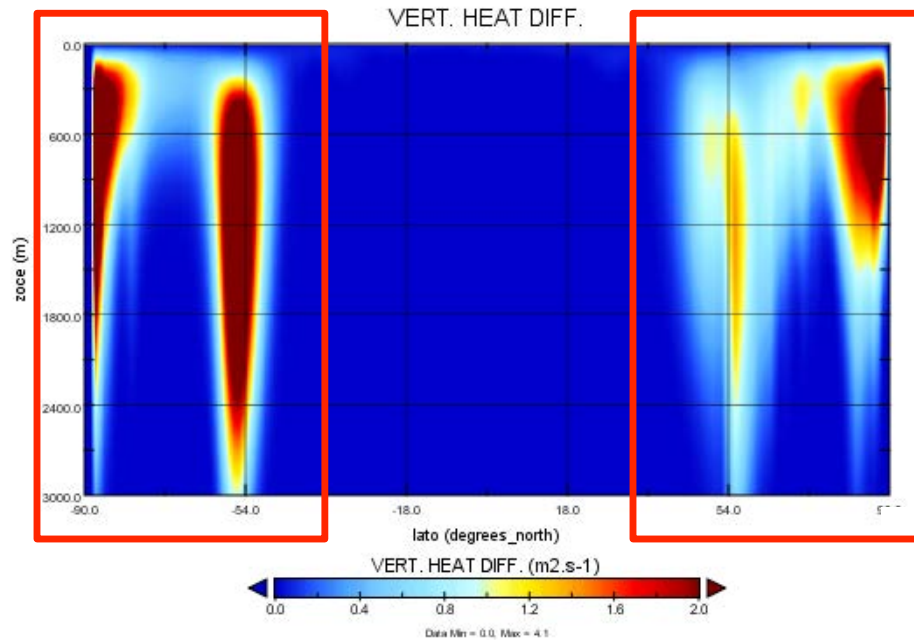
OCEAN/LAKE ICE COVERAGE



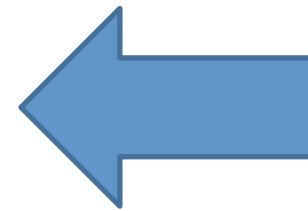
YEAR 400



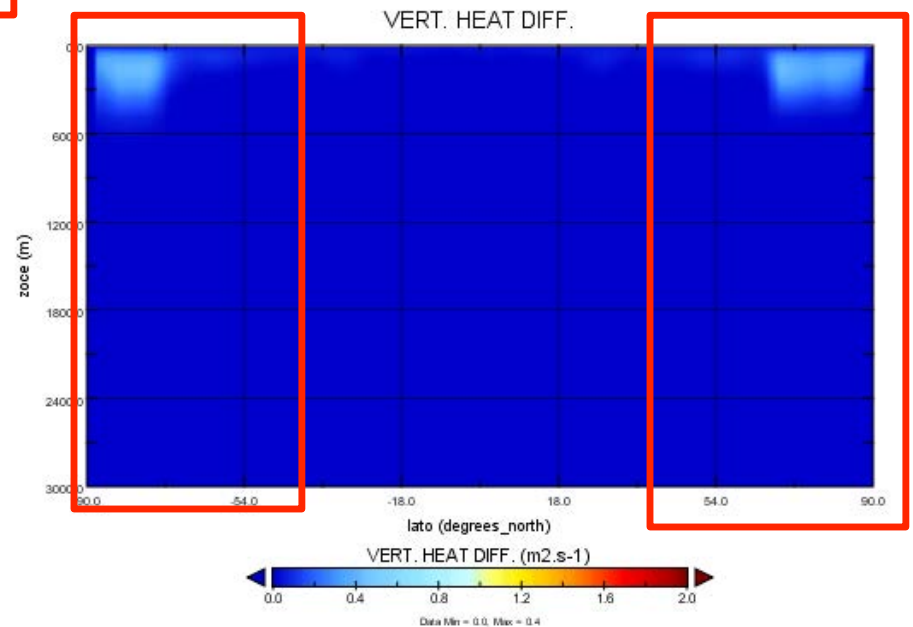
Vertical Heat Diffusivity

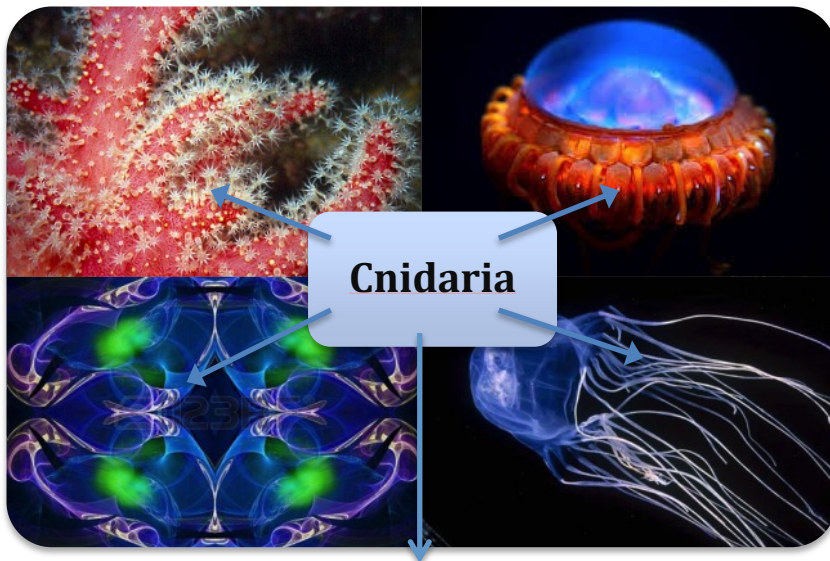


YEAR 2000



YEAR 400





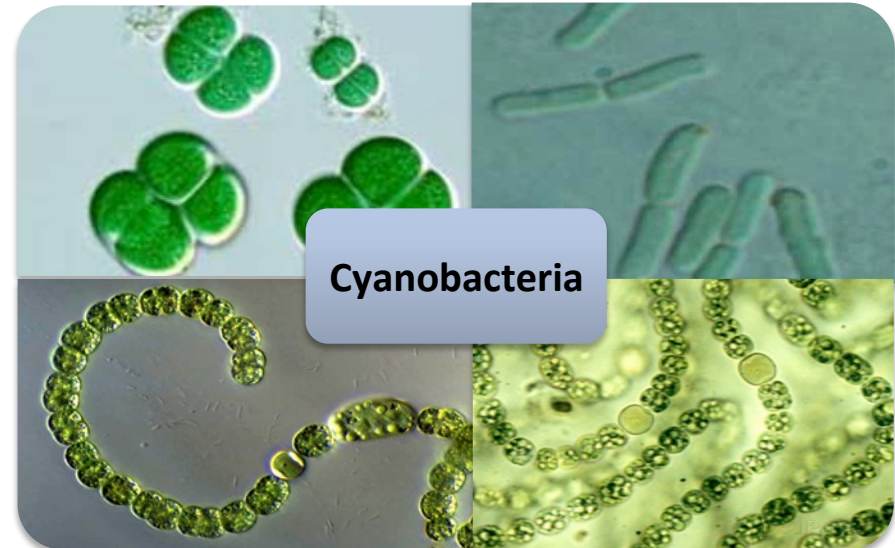
- Red Sea Fingers
- Wyvilles crown Jellyfish
- Kaleidoscope Jellyfish
- Box Jellyfish
- Deep-Red Jellyfish

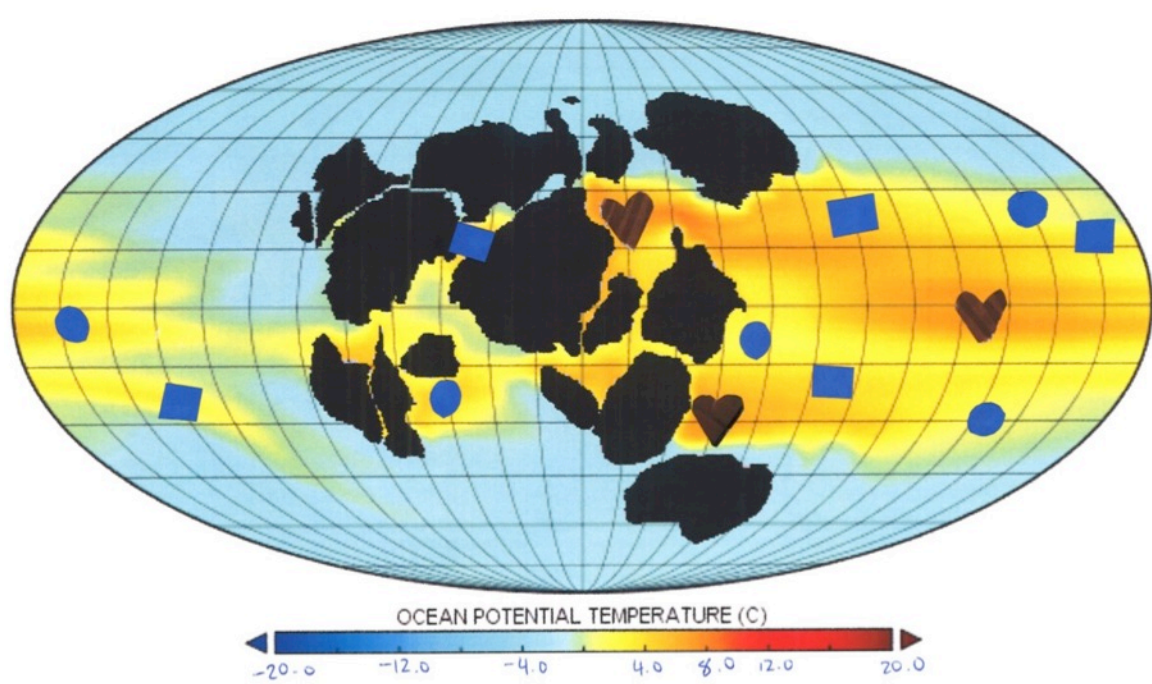
Organisms Examined



Barrel Sponge, Red Tree Sponge, Flesh Sponge, Red Boring Sponge

Synechocystis, Thermosynechococcus, Anabaena, Nostoc

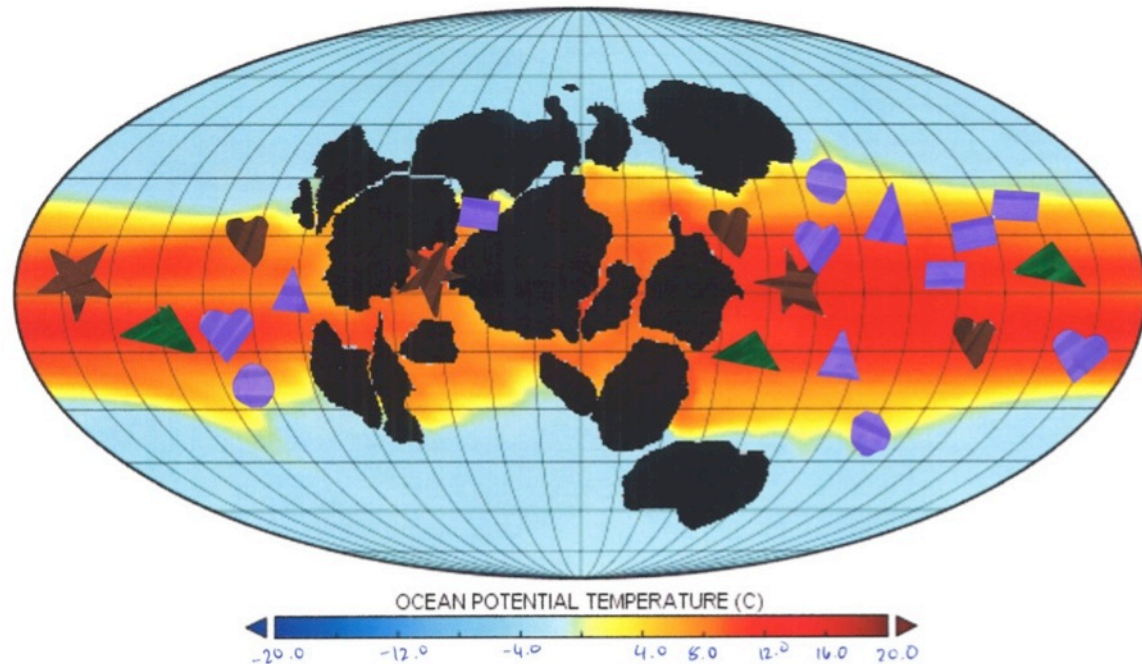


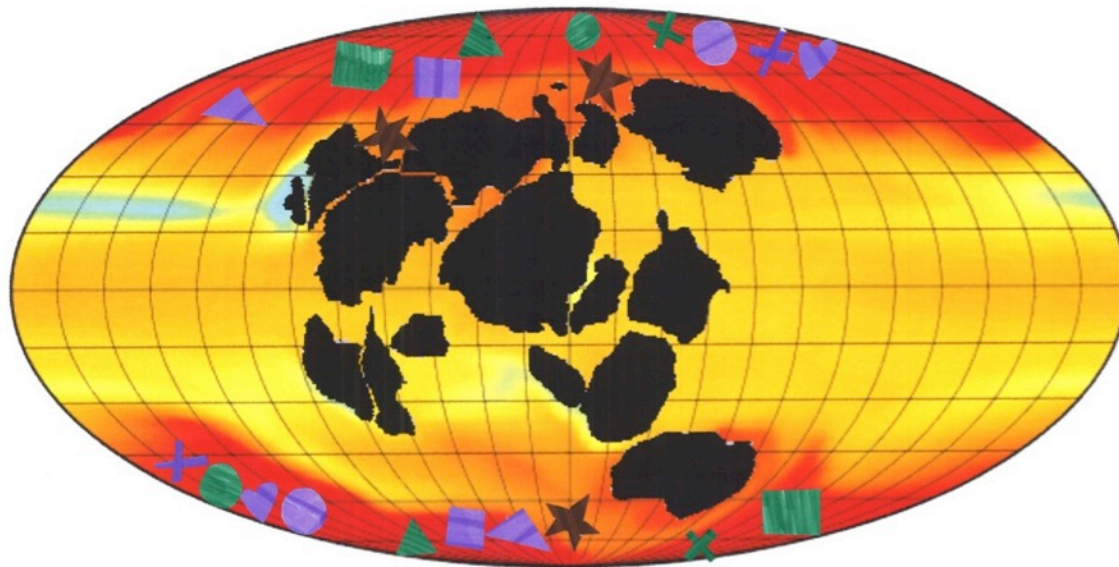


← 116 meters

**Ocean Potential
Temperature
(°C)**

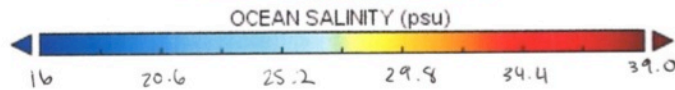
328 meters →



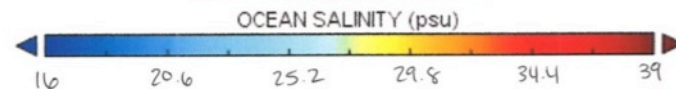
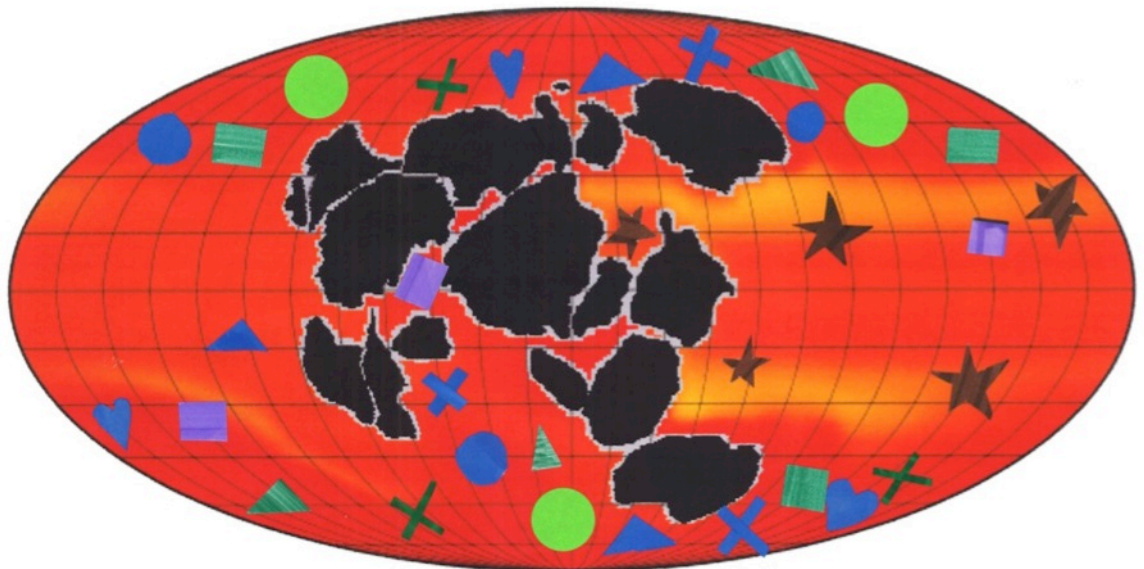


← 43 meters

**Ocean Salinity
(PSU)**



559 meters →

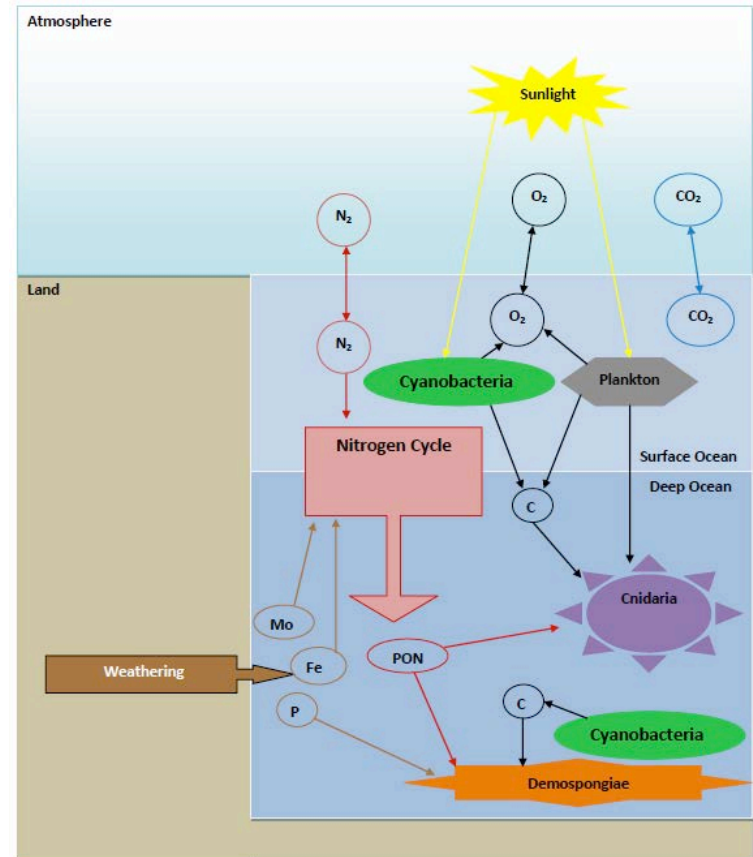


Future Research

- Nutrient Distribution

- More Organisms

- Run the Model for 500 More Years



References

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A collage of images including a nebula, Earth from space, a satellite, Saturn, a city skyline, and a person in a cleanroom.

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